What Is Claimed Is:

1. A through-in grinding method for centerless-grinding cylindrical a work being machined having a conical surface at an end thereof, wherein:

said work being machined is supported by a blade and a regulating wheel to which a feed angle is imparted;

through-feed grinding is performed, causing cylindrical surface of a grinding wheel having cylindrical and conical surfaces to contact the cylindrical surface of said work being machined while causing said grinding wheel to revolve; and

stopping through-feed grinding when the conical surface of said work being machined that was moved in the axial direction by said through-feed grinding makes contact with the conical surface of said grinding wheel, and grinding the conical and cylindrical surfaces of said work being machined in a condition closely approximating in-feed grinding.

2. A through-in grinding method for centerless-grinding the cylindrical surface and one end surface of a work being machined having a cylindrical surface and an end surface, wherein:

said work being machined is supported by a blade and a regulating wheel to which a feed angle is imparted;

through-feed grinding is performed, causing a small-diameter portion of a grinding wheel which has a large-diameter portion, a small-diameter portion, and a step surface to contact the cylindrical surface of said work being machined while causing said grinding wheel to revolve; and

stopping the through-feed grinding when the end surface of said work being machined that was moved in the axial direction by said through-feed grinding makes contact with the step surface of said grinding wheel, and grinding the cylindrical and end surfaces of said work being machined in a condition closely approximating in-feed grinding.

3. A through-in grinding method for centerless-grinding a work being machined having a cylindrical surface being machined, having a conical surface being machined in one end portion, and having a portion having a larger diameter than said cylindrical surface being machined near the other end portion, wherein:

said cylindrical surface being machined of said work being machined is supported by a blade and a regulating wheel to which a feed angle is imparted;

through-feed grinding is performed, causing the cylindrical surface of a grinding wheel having cylindrical and conical surfaces to contact said cylindrical surface being machined of said work being

machined while causing said grinding wheel to revolve; and

causing the step surface of large-diameter portion of said work being machined to contact the end surface of said grinding wheel and stopping through-feed grinding at approximately same time with that the conical surface of said work being machined that was moved in the axial direction by said through-feed grinding makes contact with the conical surface of said grinding wheel, and grinding the conical surface and cylindrical surface being machined, and step surface of the large-diameter portion, of said work being machined, in a condition closely approximating in-feed grinding; or

causing the conical surface of said work being machined to contact the conical surface of said grinding wheel and stopping through-feed grinding before the step surface in large-diameter portion of said work being machined that was moved in the axial direction by said through-feed grinding makes contact with the end surface of said grinding wheel, and grinding the conical surface and cylindrical surface being machined of said work being machined, in a condition closely approximating in-feed grinding.

4. A through-in grinding method for centerless-grinding work being machined having a cylindrical surface being machined, one end surface of which is a surface

being machined, and having a portion having a larger diameter than said cylindrical surface being machined, near the other end portion, wherein:

said cylindrical surface being machined of said work being machined is supported by a blade and a regulating wheel to which a feed angle is imparted;

through-feed grinding is performed, causing a small-diameter portion of a grinding wheel, which has a large-diameter portion, a small-diameter portion, and a step surface, to contact the cylindrical surface being machined of said work being machined while causing said grinding wheel to revolve; and

causing the step surface of large-diameter portion of said work being machined to contact the end surface of said grinding wheel and stopping through-feed grinding at approximately same time with that the end surface of said work being machined that was moved in the axial direction by said through-feed grinding makes contact with the step surface of said grinding wheel, and grinding the end surface, cylindrical surface being machined, and step surface of the large-diameter portion, of said work being machined, in a condition closely approximating in-feed grinding; or

causing the end surface of said work being machined to contact the step surface of said grinding wheel and stopping through-feed grinding before the step

surface in the large-diameter portion of said work being machined that was through-fed in the axial direction by said through-feed grinding makes contact with the end surface of said grinding wheel, and grinding the end surface and cylindrical surface being machined of said work being machined, in a condition closely approximating in-feed grinding.

5. A through-in grinding method for centerless-grinding a work being machined comprising a weak conical surface approximating a cylindrical surface, which has a relatively small apex angle, and a strong conical surface which has a relatively large apex angle, formed near the end on the small-diameter side of said weak conical surface, wherein:

said work being machined is supported by a blade and a regulating wheel to which a feed angle is imparted;

through-feed grinding is performed, while causing a grinding wheel having a weak conical surface of small apex angle, corresponding to said weak conical surface of said work being machined, and a strong conical surface of large apex angle, corresponding to said strong conical surface of said work being machined, to revolve, causing said weak conical surface of said grinding wheel to contact said weak conical surface of said work being machined; and

stopping through-feed grinding when said strong conical surface of said work being machined that was moved in the axial direction by said through-feed grinding makes contact with said strong conical surface of said grinding wheel, and grinding said strong conical surface and said weak conical surface of said work being machined in a condition closely approximating in-feed grinding.

6. The through-in grinding method according to any one of claims 1 to 5, wherein, when said work being machined is subjected to through-feed grinding and through-fed in the axial direction, a stopper is provided beforehand, movement of said work being machined in through-feed direction is stopped by causing said work being machined to abut against said stopper, through-feed grinding is thereby stopped, and a quasi in-feed grinding condition is generated.

7. The through-in grinding method according to any one of claims 1 to 6, wherein: when said work being machined has been ground in a condition closely approximating in-feed grinding after being subjected to through-feed grinding, if it is judged that said work being machined has been ground and finished to prescribed dimensions, said regulating wheel is retracted in a direction that separates same from said blade; and, by causing said work being machined to pass between said

regulating wheel and said blade and drop down, the quasi in-feed grinding is terminated, and said work being machined is unloaded.

8. A through-in grinding apparatus comprising:

a regulating wheel supported so that a feed angle can be imparted thereto;

a grinding wheel having a cylindrical surface and a conical surface formed therein;

a blade for supporting a work being machined in cooperation with said regulating wheel;

stopping means for limiting movement, in the through-feed direction, of said work being machined that is supported by said regulating wheel and said blade;

means for conveying said work being machined in the axial direction and feeding same to a position where same is supported by said regulating wheel and said blade; and

means for separating said regulating wheel from said blade and causing said work being machined to drop down by gravity.

9. A through-in grinding apparatus comprising:

a regulating wheel supported so that a feed angle can be imparted thereto;

a grinding wheel having a large-diameter portion, a small-diameter portion, and a step surface formed therein;

a blade for supporting a work being machined in cooperation with said regulating wheel;

means for feeding said work being machined in the axial direction to a position where same is supported by said regulating wheel and said blade; and

means for separating said regulating wheel from said blade and causing said work being machined to drop down by gravity.

10. A through-in grinding apparatus comprising:

a regulating wheel supported so that a feed angle can be imparted thereto;

a grinding wheel having a weak conical portion that has a small apex angle, which is nearly cylindrical, and a strong conical portion that has a large apex angle;

a blade for supporting a work being machined in cooperation with said regulating wheel;

stopper means for limiting movement, in the through-feed direction, of said work being machined that is supported by said regulating wheel and said blade;

means for feeding said work being machined in the axial direction to a position where same is supported by said regulating wheel and said blade; and

means for separating said regulating wheel from said blade and causing said work being machined to drop down by gravity.

11. A through-in grinding apparatus comprising:

a regulating wheel supported so that a feed angle can be imparted thereto;

a grinding wheel having a weak conical portion that has a small apex angle, which is nearly cylindrical, a large-diameter portion positioned adjacent to the end on the large-diameter side of said weak conical portion, and a step surface between said large-diameter portion and the end on the large-diameter side of said weak conical portion;

a blade for supporting a work being machined in cooperation with said regulating wheel;

means for feeding said work being machined in the axial direction to a position where same is supported by said regulating wheel and said blade; and

means for separating said regulating wheel from said blade and causing said work being machined to drop down by gravity.